

Appl. No. : 09/801,542  
Filed : March 7, 2001

**LISTING OF THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application. In this listing, Claims 35, 44, 50 and 57 have been amended.

1-34. **(Canceled)**

35. **(Currently amended)** A method for growing a thin film on a substrate by exposing the substrate in a reaction chamber defined by a plurality of walls to alternate surface reactions of vapor-phase reactants, comprising:

controlling a chamber wall temperature of at least those portions of the chamber walls that are exposed to the vapor-phase reactants;

loading the substrate onto a substrate support structure inside the reaction chamber;

controlling a substrate support temperature independently of the chamber wall temperature; and

alternately and sequentially feeding at least two vapor phase reactants into the reaction chamber

wherein the substrate support temperature is maintained at a first temperature and the chamber wall temperature is maintained at a second temperature different from the substrate support temperature and, wherein ~~a difference between~~ the first temperature and the second temperature ~~[[is]] are within an atomic layer deposition (ALD) temperature window such that there is atomic layer deposition (ALD) growth on the substrate and the chamber wall and the difference between the first temperature and the second temperature is selected to maintain a lower rate of atomic layer deposition (ALD) film growth upon the chamber walls as compared to the substrate.~~

36. **(Canceled)**

37. **(Previously presented)** The method of Claim 35, wherein the chamber wall temperature is maintained higher than the substrate support temperature.

38. **(Original)** The method of Claim 37, wherein the chamber wall temperature is controlled at a level low enough to prevent thermal decomposition of the reactants.

Appl. No. : 09/801,542  
Filed : March 7, 2001

39. **(Previously presented)** The method of Claim 35, wherein the chamber wall temperature is maintained lower than the substrate support temperature.

40. **(Original)** The method of Claim 39, wherein the chamber wall temperature is controlled at a level high enough to prevent condensation of one of the reactants on the wall.

41. **(Original)** The method of Claim 39, wherein the chamber wall temperature is controlled at a level high enough to prevent physisorption of one of the reactants on the wall.

42. **(Original)** The method of Claim 39, wherein one of the reactants is water and the wall is maintained at a temperature of 200°C or higher.

43. **(Previously presented)** The method of Claim 35, wherein the chamber wall temperature is maintained higher than a temperature of the reactants as they enter the reaction chamber.

44. **(Currently amended)** A method for growing a thin film on a substrate by exposing the substrate in a reaction chamber defined by a plurality of chamber walls to alternate surface reactions of vapor-phase reactants, comprising:

loading the substrate onto a substrate support structure inside the reaction chamber;

maintaining the substrate support at a first temperature within an first ALD temperature window by means of a first temperature controller;

maintaining at least portions of the chamber walls that are exposed to the vapor-phase reactants at a second temperature different from the first temperature by means of a second temperature controller, the second temperature being within a second ALD temperature window that encompasses the first ALD temperature window; and

alternately and sequentially feeding at least two vapor phase reactants into the reaction chamber;

wherein the second temperature is selected to lower a rate of atomic layer deposition (ALD) film growth upon the walls relative to the substrate; and

growing ALD film on the chamber walls at a lower rate as compared to the substrate.

45. **(Original)** The method of Claim 44, wherein the second temperature is maintained higher than the first temperature.

46. **(Original)** The method of Claim 45, wherein maintaining the first temperature comprises removing heat from the substrate support.

47. **(Original)** The method of Claim 46, wherein removing heat comprises circulating a fluid through the substrate support.

48. **(Original)** The method of Claim 44, wherein the second temperature is maintained lower than the first temperature.

49. **(Canceled)**

50. **(Currently amended)** A method for preventing unwanted deposition on walls of an atomic layer deposition reaction chamber, comprising controlling a temperature of a substrate and independently controlling a temperature of at least those portions of the chamber walls exposed to reactants, such that both the temperature of the substrate and the temperature of the walls are within an ALD temperature window and a rate of deposition by self-limited atomic layer deposition on the substrate is maximized while self-limited atomic layer deposition (ALD) film growth on the walls is reduced relative to controlling a temperature of the substrate alone.

51. **(Original)** The method of Claim 50, wherein controlling the chamber wall temperature comprises heating the chamber walls.

52. **(Original)** The method of Claim 50, wherein controlling the substrate temperature comprises heating the substrate.

53. **(Original)** The method of Claim 50, wherein controlling the wall temperature comprises maintaining the wall temperature in a range to accomplish atomic layer deposition upon the walls.

54. **(Original)** The method of Claim 50, wherein controlling the wall temperature comprises maintaining the wall temperature in a range to avoid condensation and physisorption of reactants upon the walls.

55. **(Original)** The method of Claim 54, wherein controlling the wall temperature comprises maintaining the wall temperature in a range to avoid thermal decomposition of reactants upon the walls.

Appl. No. : 09/801,542  
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56. **(Original)** The method of Claim 55, wherein controlling the wall temperature comprises maintaining the wall temperature in a range to reduce film growth rates upon the walls relative to deposition rates upon the substrate.

57. **(Currently amended)** A method for growing a thin film on a substrate by exposing the substrate in a reaction chamber defined by a plurality of walls to alternate surface reactions of vapor-phase reactants, comprising:

controlling a chamber wall temperature of at least those portions of the chamber walls that are exposed to the vapor-phase reactants;

loading the substrate onto a substrate support structure inside the reaction chamber;

controlling a temperature of the substrate independently of the chamber wall temperature;

alternately and sequentially feeding at least two vapor phase reactants into the reaction chamber; and

maintaining the temperature of the substrate within [[an]] a first ALD temperature window such that approximately one monolayer is deposited per full cycle and maintaining the chamber wall temperature within a second ALD temperature window that is either (i) above a lower temperature limit at which condensation takes place on the chamber walls and below the first ALD temperature window or (ii) below a high temperature limit at which thermal decomposition causes deposition on the chamber walls and above the first ALD temperature window.